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ABSTRACT

This study examined the effects of mental practice (MP), slow motion mental practice (SMMP), and attention placebo control (APC) on the performance of the putting throw in Frisbee disc golf. Subjects were randomly assigned to the three groups and participated in a pre-treatment performance session, a five session treatment phase, and a post-treatment performance session. Performance changes were examined, as were repeated measures manipulation check questionnaires. It was hypothesized that the SMMP group would demonstrate the greatest improvement due to the possible imagery-enhancement effects of the slowed presentation of mental practice, that the MP group would also show significant improvement, and that the APC group would show slight non-significant improvement because of expectancy factors. Performance analysis of variance (ANOVA) revealed no significant main or interaction effects, but did indicate a slight trend toward improvement on the repeated measures factor. A number of suggestions for the improvement of the present design were offered, and it was concluded that further, methodologically-sound and theoretically-based experimentation is needed in this area. (Authors)

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Rate of Imagery in Mental Practice:

An Experimental Investigation

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Abstract

This study examined the effects of mental practice (MP), slow motion mental practice (SMMP), and attention placebo control (APC) on the performance of the putting throw in Frisbee disc golf. Subjects were randomly assigned to the three groups and participated in a pre-treatment performance session, a five session treatment phase, and a post-treatment performance session. Performance changes were examined, as were repeated measures manipulation check questionnaires. It was hypothesized that the SMMP group would demonstrate the greatest improvement due to the possible imagery-enhancement effects of the slowed presentation of mental practice, that the MP group would also show significant improvement, and that the APC group would show slight non-significant improvement because of expectancy factors. Performance analysis of variance (ANOVA) revealed no significant main or interaction effects, but did indicate a slight trend toward improvement on the repeated measures factor. A number of suggestions for the improvement of the present design were offered, and it was concluded that further, methodologically-sound and theoretically-based experimentation is needed in this area.

Rate of Imagery in Mental Practice:
An Experimental Investigation

Mental practice has been defined as "the symbolic rehearsal of a physical activity in the absence of any gross muscular movements" (Richardson, 1967a, p. 95) and has been applied to a vast number of athletic and motoric skills. In the nearly seventy years since it first appeared in the literature (Washburn, 1916), mental practice and its variants have been employed by ski racers (Suinn, 1972), bowlers (Barnes, 1982), dart throwers (Biron, 1985), gymnasts (Gilmore, 1973), basketball players (Meyers & Schleser, 1980), tennis players (Noel, 1980), volleyball players (Shick, 1970), karate students (Weinberg, Seabourne, & Jackson, 1981), swimmers (White, Ashton, & Lewis, 1979), and golfers (Glore, 1982). This list is by no means exhaustive, but it helps to illustrate the fact that mental practice techniques have been applied in a broad fashion over a number of years. It is the task of both the literature reviewer and the conscientious researcher to critically evaluate the available literature in order to determine whether this widely utilized technique indeed has merit as a performance enhancement technique, or whether it has been blindly misapplied.

Reviewers of the mental practice literature have indicated that although a substantial amount of the research in this area is either largely anecdotal or methodologically weak, under certain specific circumstances, mental practice appears to be a relatively effective means of enhancing the performance of motor skills (Corbin, 1972; Richardson, 1967a, 1967b; Weinberg, 1982). Weinberg (1982) provides an excellent summary of the more general conclusions which have been drawn

from this diverse body of literature. He suggests that in applied settings, a combined mental practice /physical practice format is perhaps the treatment of choice for most skills, and that mental practice should be used only to supplement physical practice, not to replace it. Weinberg also suggests that a certain degree of familiarity with the task is necessary for mental practice to be effective. Additionally, he points out that research has indicated that there may be an optimal time for the mental practice interval, and that at intervals greater than five minutes, subjects begin to show deficits in concentration. Also, research on subject characteristics indicates that when using the technique, mental practice subjects should utilize an internal or "player oriented" perspective while imaging, and that those whose images are clear, vivid, and controllable perhaps derive the most benefit from mental practice. Finally, Weinberg states that research which demonstrates that mental practice promotes covert muscular activity supports a feedback theory of mental practice. In other words, the minute muscular innervation which results from mental practice provides neural facilitation for enhanced motor performance.

Theory

Theoretical formulations of why mental practice is effective in the performance of motor skills are numerous and diverse. Both Richardson (1967b), and Corbin (1972) provide overviews of some of these theories, but in particular, both include relatively lengthy descriptions of feedback theory. Although the majority of studies in the mental practice literature make no mention of theory, it appears that feedback theory is the most widely cited (Epstein, 1980; Mendoza & Wichman, 1978; Minas, 1978; Sage, 1977; Zecker, 1982), and perhaps holds the

most explanatory power of all mental practice theories. In explaining feedback theory, Richardson (1967b) and Corbin (1972) have stated that mental practice may be effective because of the ideomotor, or psychoneuromuscular properties of imagery which James (1890), and later Washburn (1916) described. According to this line of reasoning, imagination of bodily movement promotes covert muscular activity similar to the activity which would occur if the task were actually being performed, except on a much smaller scale. This minute muscular activity then serves as kinesthetic feedback which the subject utilizes to refine coordination of the task over repeated trials. Richardson (1967b) proposed that this is a process which is similar to the process which may occur in actual physical practice of the task. During physical practice, according to Richardson:

> "When an object is thrown at a target, visual feedback provides information regarding the degree of deviation and kinesthetic feedback provides information regarding the positions of the body musculature that are associated with varying degrees of deviation. As a result of this information corrections are made, and the accuracy of subsequent throws gradually increases" (p. 266).

Richardson noted that when a person imagines the performance of a motor task, he or she produces the tiny muscular innervations which Jacobson (1932) was able to measure via EMG recordings. Furthermore, Richardson cites Leuba and Dunlaps' (1951) results which suggest that this kinesthetic feedback is also capable of evoking the visual image which is associated with it. With this visual-kinesthetic feedback, the person can then (perhaps subconsciously) make the appropriate corrections to improve coordination on the next mental trial.

Using feedback theory as a conceptual guide, the present study posits that this feedback process may be enhanced and enriched through the use of a predominantly "slow motion" rate of mental imagery. The reasoning behind this proposition relates to the efficacy of some current psychotherapeutic techniques (e.g. relaxation techniques, meditation, hypnosis) which emphasize an exaggerated slowing down of the client's information processing. Means (1983) emphasizes that these slowing down and focusing techniques may aid in healing through a slow and careful feeding of information to the client. In this way, perhaps details which were once unseen become very clear, and likewise, feelings which were once vague and nondescript, become perspicuous. As related to mental practice, perhaps this same process of slowing down the subject's inner experience can lead to more vivid and clear-cut visual and kinesthetic feedback of the imagined motor task, eventually resulting in improved performance of the motor task. If the mental practice experience is slowed down, it may be less likely that mistakes in execution are overlooked, allowing for more adequate correction of the imagined behavior.

Published research on this proposition is not currently available. Some researchers, however, have included some slow motion instructions to their mental practice subjects (Epstein, 1980; Gravel, Lemieux, & Ladouceur, 1980; Suinn, 1972), but this factor has not been subjected to experimental manipulation. There may, however, be some indirect evidence which suggests that slow motion procedures lead to increased performance. Ryan and Simons (1981) reported that subjects who mentally practiced a motor skill less frequently during their designated mental practice intervals exhibited higher performance scores than subjects who

mentally practiced the skill more often. Although Ryan and Simons did not directly state that these subjects were using slow motion imagery, they did anecdotally report that these subjects often appeared to be attending to more details, of both a visual and kinesthetic nature. Perhaps these subjects were actually slowing down their phenomenological experiences to the point where this feedback was of most value.

A second source of indirect support for the present proposition comes from the hypnosis literature. Hypnosis has long been a technique used by sport psychologists for performance-enhancement (Johnson, 1970). Baer (1980) reported that performance of a video tennis game (Pong) was enhanced through hypnotic time-slowing suggestions in a within subjects ABABAB reversal design. Baer's results can be questioned because of fairly substantial baseline instability, but the study nonetheless poses some interesting questions about the effects of slowing down the subject's experience on subsequent motor performance.

Design Considerations

The present study was performed according to a variation of the standard paradigm used in most mental practice studies. That is, subjects' performances on a pre-treatment measure were compared to their performances on the same measure at post-treatment. The specific treatments for the present study consisted of standard mental practice (MP) for the first group, slow motion mental practice (SMMP) for the second group, and an attention placebo control (APC) "instructional package" for the third group.

The performance task which was chosen is the "putting" stroke which is involved in the relatively new game of Frisbee disc golf. This game is the flying disc sports analogue of ball golf. The putting stroke involves a short (usually within ten meters) throw of the flying disc at the "hole", a standardized, basket-like catching device. A putt which lands in the basket is considered a hit, whereas one which does not is considered a miss.

This particular task was chosen for a number of reasons. First, the throwing of a Frisbee disc is a task with which a great number of college students (the subject population for the present study) is relatively familiar. Corbin (1967) suggested that mental practice is most effective on those tasks with which the subject has some degree of familiarity. Second, when performed in an indoor environment (as this study was), this task is a closed skill. Highlen and Bennett (1979) suggested that mental practice techniques are most effective with closed or non-interactive skills, as opposed to open skills. Third, this task, unlike a number of tasks reported on in previous studies (e.g. gymnastics, karate), is easily quantifiable and requires no subjective evaluation. Finally, this task has not previously been used as a performance measure in the mental practice literature.

As was previously mentioned, the two treatment groups of interest were a standard mental practice (MP) group and a slow motion mental practice (SMMP) group. The MP group received closely guided mental rehearsal instructions which attended to visual, kinesthetic, and affective components of the experience. The SMMP group received parallel instructions to the MP group, but these subjects were further instructed to experience the majority of their mental practice trials in slow

motion imagery. A final group was used as an attention placebo control (APC), to primarily control for motivational and expectancy effects. The APC group met for the same length of time as the MP and SMMP groups, and received a "Flying Disc Skills Instructional Package". This included Frisbee disc promotional films from the Wham-O Manufacturing Company, and in-session biblio-instruction of nonspecific Frisbee disc throwing skills. That is, the subjects read about a number of disc throws which require throwing dynamics that are relatively different from those involved in disc golf putting.

It was hypothesized that both the MP and SMMP groups would show significantly greater pre- to post-treatment performance increases than the APC group. Furthermore, it was hypothesized that the inclusion of the slow motion practice factor would lead the SMMP group to perform at higher levels than the MP group. Finally, it was hypothesized that the APC group would exhibit marginal performance increases primarily due to the effects of an expectancy for improvement, but that these increases would not approach significance.

Method

Subjects

The subjects were 66 male Introductory Psychology (Psychology 110) students at the University of Montana. Ages ranged between 18 and 31 years ($\bar{x}$=20.97, s.d.=3.31). The subjects voluntarily participated in partial fulfillment of the experimental credit requirement for Psychology 110. Subjects were randomly assigned to one of the three groups.

Apparatus

The primary apparatus was the standard Frisbee disc catching device used in the game of Frisbee disc golf. This Disc Pole Hole (U.S. PATENT NO. 4039189) is manufactured by the Disc Golf Association (D.G.A.), has a 27 X 22 inch target area, and is constructed of welded and hot-dipped galvanized steel.[2]

Five D.G.A. Kittyhawk golf discs were also used. These discs measure 21 cm. in diameter, and weigh exactly 174 grams each. These are specially designed for use in disc golf putting.

Procedure

Pre-Treatment Performance Measurement. Following randomization to treatment groups, each subject arrived at a campus gymnasium for individual pre-treatment performance measurement. This took place on the weekend immediately preceeding the treatment week. They were greeted by the experimenter, introduced to an assistant who was blind to the experimental hypotheses, and given a short introduction to the study by the assistant. The assistant then narrated a brief instruction of the putting throw while the experimenter demonstrated the procedure. The subject was then allowed five practice throws, after which his pre-treatment performance was recorded (five throws from each of ten throwing stations). Throwing stations were linearly marked at two foot increments, and ranged between 12 and 30 feet from the target. The total number of throws out of 50 which landed completely in the Pole Hole constituted the subject's pre-treatment score. The subject was thanked and reminded to return on Monday evening to begin his treatment.

Mental Practice Procedure. These subjects received "standard" audio taped group mental practice instruction after having been given a brief MP rationale by a research assistant. This instruction included a short relaxation phase in which the subjects were instructed to close their eyes, to assume a comfortable seated position, and to relax to the best of their abilities. This phase was followed by closely guided and highly structured visual, kinesthetic, and affective imaginal practice of the putting throw. Each set of three mental practice trials lasted approximately five minutes. A total of three sets of trials were presented. Each set of trials was separated by an intertrial interval (ITI) of two minutes, during which the subjects were instructed to remain relaxed, but to open their eyes and converse at their leisure. At the end of each ITI the subjects were asked to again close their eyes and relax for the next set. After the third set of trials, the group was aroused, given a paper-pencil manipulation check, and asked to not practice the task on their own either mentally or physically. This entire procedure was repeated for five nights.

Slow Motion Mental Practice Procedure. These subjects received "slow motion" audio taped group mental practice instruction after having been given a brief SMMP rationale by a research assistant. This group was conducted identically to the MP group, and used virtually the same mental practice script. These subjects were, however, instructed to experience the second and third trials of each set in slow motion. Therefore, at the end of each treatment session, they had experienced a total of three trials at "normal" speed, and a total of six trials at a slowed rate of speed. At the end of the third set, these subjects were also given the paper-pencil manipulation check and asked to refrain from

extra-session mental and physical practice.

Attention Placebo Control Procedure. This group met each of the five nights for approximately the same length of time as the two preceeding groups. This group was given a "Flying Disc Skills Instructional Package" which was purported to lead to an enhancement of Frisbee disc skills. The first session consisted of a 25 minute Frisbee disc promotional film. This film was not produced with the intention to instruct the viewer on disc skills, but rather, to provide brief exposure to a variety of flying disc sports. After the film, the subjects were asked to complete a shortened version of the manipulation check.

On the second, third, and fourth nights of treatment, the APC group was given biblio-instruction of disc golf skills. Disc physics and flight characteristics (night 2), the disc golf approach throw (night 3), and the tee shot in disc golf (night 4) were the topics covered. Additionally, the manipulation check was administered at the end of these sessions. On the fifth night this group viewed a second disc film, and completed the manipulation check for a final time. Finally, at the close of each session, this group was also asked to not practice any of the skills at home.

Post-Treatment Performance Procedure. On the weekend following the final session, each subject was asked to return to the performance site, where he individually performed an additional 50 trials following the 5 throw warm-up period. Each subject was then thanked for his cooperation, debriefed, and dismissed.

Results

Pre-post performance results were analyzed with a 3(groups) X 2(repeated measures) Ullrich-Pitz Analysis of Variance (ANOVA). The analysis revealed no significant group main effect, $F(2,63)=.12$, $p>.05$, but there was a slight, non-significant trend indicating some improvement on the repeated measures factor, $F(1,63)=3.32$, $p=.07$. Although the group X repeated measures interaction was also not significant, $F(2,63)=1.76$, $p>.05$, an inspection of these results is nonetheless informative. These results indicated that subjects in the standard mental practice group (MP) improved an average of 2.27 hits from pre- to posttest (10.94% increase). In the slow motion mental practice group (SMMP), there was an average improvement of 1.14 hits from pre- to posttest (5.62% increase). Finally, in the attention placebo control group (APC), there was an average performance decrement of .32 hits from pre- to posttest (1.57% decrease). These results are illustrated in Figure 1.

Insert Figure 1 about here

Upon initial inspection, this figure illustrates what appear to be marked pretest group differences. A separate one-way ANOVA revealed, however, that these differences were not significant, $F(2,63)=.53$, $p>.05$. In addition, the possibility that the lack of group X repeated measures significance was due to an underlying heterogeneity of variance was ruled out with Hartley's FMAX test, $F(1,63)=1.13$, $p>.05$.

Analysis of the questionnaire data was performed in two steps. The first step consisted of an analysis of the items common to all three groups (i.e. treatment credibility, subject attentiveness, comprehension of treatment material, volitional/subliminal extra-session practice). The second step consisted of an analysis of the items common to only the two mental practice groups (i.e. imagery vividness, controllability, internality/externality, rate of imagery, number of mental practice trials).

In the first step questionnaire analysis, a 3(groups) X 5(repeated measures) X 4(items) Ullrich-Pitz ANOVA was performed on the four, seven-point Likert scale items, and a 3X5X2 ANOVA was performed on the two dichotomous items. A Newman-Keuls multiple comparison analysis revealed no significant between-groups differences on any of these items. Item means across groups indicated that the subjects generally perceived each treatment as being worthwhile in some way, and as being a possible means of enhancing their Frisbee disc skills. Results also suggested that all groups were, on the average, moderately attentive to the instructional procedures, and that they found the material to be highly understandable. Finally, results indicated that a significant majority of all subjects refrained from any extra-session practice, and that only a small percentage of the total sample experienced dreams or daydreams about the procedures. Table 1 contains group means for each of the questions common to the three groups.

Insert Table 1 about here

It is interesting to note that visual inspection of the average values across items 1-4 indicates that the SMMP treatment held the strongest face validity of all treatments ($\bar{x}$=5.46), followed by the APC treatment ($\bar{x}$=5.30), and the MP treatment ($\bar{x}$=5.24). These group differences, however, were not significant, $F(2,9)=.11$, $p>.05$.

In the second step questionnaire analysis, a 2(groups) X 5(repeated measures) X 8(items) Ullrich-Pitz ANOVA was performed on the eight, seven-point Likert scale items, and a 2X5X2 ANOVA was performed on the two items regarding the number of mental practice trials performed. Again, no significant between-groups differences were found on any of these items at the .05 alpha level. Item means across groups indicated that a substantial amount of visual imagery was experienced by the participants in the two mental practice groups, and that this imagery was moderately vivid and fairly controllable. Furthermore, across-group means suggested that the majority of subjects in these groups experienced their mental exercises from a predominantly "internal" or player-oriented perspective, and that a moderate amount of kinesthetic sensation accompanied their mental practice. This kinesthetic sensation was described, on the average, as being moderately intense and was relatively controllable. In addition, the majority of subjects reported that the rate of their imagery was marginally slower than "real life" speed. Finally, results indicated that the average number of mental practice trials which were performed across groups was slightly greater than the number of trials which they were asked to perform ($\bar{x}$=9.17). The number of these shots which were imagined as being "successful" ($\bar{x}$=8.81), was significantly lower than the average number of mental practice trials performed, $F(1,42)=11.68$, $p<.05$. Table 2 contains group

means for the items common to the two mental practice treatment groups.

Insert Table 2 about here

Inspection of the average values across items 1-9 (with the values for item 9 inverted to ensure uniform directionality) indicates that the SMMP treatment again had greater face validity ($\bar{x}$=4.73) than did the MP treatment ($\bar{x}$=4.61). These group differences were not significant, $F(1,14)=.11$, $p>.05$.

Discussion

Results indicated that although there appeared to be some performance change in the predicted direction for the two treatment groups, this change was not significantly different from the change demonstrated by an attention placebo control group. These results are not consistent with a substantial body of research which suggests that mental practice, in and of itself, is a significantly effective motor performance enhancement technique (e.g. Clark, 1960; Corbin, 1967b; Mendoza & Wichman, 1978; Ryan & Simons, 1981; Zecker, 1982).

This demonstrated ineffectiveness of both mental practice procedures might be explained in a number of different ways. First, there may have been some specific procedural problems with the present investigation. For example, the mental practice sessions may have been too long, even though efforts were made to break the sessions into individual five minute segments. Twining (1949) stated that the optimal mental practice

period should be no longer than five minutes. Perhaps doing three, five minute mental practice segments each session led to some mild reactive inhibition effects. Another potential procedural problem may have been that the mental practice subjects experienced five sessions of the same audio tape as being rather monotonous, leading to some possible subject inattention. Although the MP and SMMP groups were not significantly less attentive than the APC group on the manipulation check, several subjects did comment on increased monotony from session to session. Additionally, the tapes may have also been overly structured. Perhaps step by step or frame by frame guidance through the imagery is too controlling, leaving little room for innovation. Another potential procedural problem may be that the length of the treatment phase was too short to allow for maximal treatment effects. A final procedural problem, and one specifically related to the lack of differences between the MP and SMMP groups, is that the slow motion factor was not seen as being salient to the SMMP subjects. Questionnaire analysis indicated that although SMMP subjects experienced their mental practice as being slower than the mental practice of the MP group, this difference was not significant. Thus, the effects of differences in "speed" of mental practice was not effectively tested in this experiment and awaits further refinements in methodology.

Another major source of potential problems with the present study has to do with subject characteristics. For example, the present results may have reflected the fact that the study was performed on a captive audience, i.e. Psychology 110 students. This is a group of subjects who are required to participate in psychological research. With this in mind, the results may be partially attributable to low subject

motivation. Another subject factor which may have influenced the results is task familiarity. Corbin (1967), suggested that specific previous experience with the task is necessary for mental practice to be effective. Although it is probably safe to assume that the majority of subjects in the present study have thrown a Frisbee disc at one time or another, it is unlikely that many of them have ever performed the putting stroke -- a rather specific and unique throwing motion. However, whether 50 pretreatment trials with the task is enough to constitute "acquaintance" remains an empirical question.

A final serious problem concerns the characteristics of the task itself. A substantial amount of performance variability can probably be attributed to the all-or-none nature of the task. For example, a great many strong shots were observed striking the target squarely, only to pass completely through the target area, landing (uncounted) on the ground. Granted, this kind of miss occurs frequently on the greens of standard golf courses when putts are struck too firmly, but this knowledge provides little solace to the player who has missed on what he or she feels to be a good shot.

Given the abovementioned potential shortcomings of the present investigation, what might be done to improve the experimenter's chances of demonstrating significant effects in the future? One modification which might be made is to have longer intertrial intervals. Perhaps this could reduce possible reactive inhibition effects. A second procedural change which could contribute to the likelihood of significance is the production of a variety of treatment tapes, each using different speakers and separate scripts. This may decrease monotony, resulting in greater subject involvement. The use of less

structured audio tapes might also lead to greater subject involvement and attention. The length of the treatment phase might also be extended, allowing ample opportunity for the subjects to benefit from mental practice training. With specific regard to further investigation of the slow motion variable, subsequent studies could benefit from extensive pilot work to ensure the saliency of the variable since the standard MP instructions were also reacted to by some slowing down of processing. The present study might be improved further through the use of volunteer athletes instead of Introductory Psychology students. In this way, subject motivation might be more uniformly raised, consequently resulting in potentially more powerful treatment effects. A final, and very important improvement on this and other mental practice studies concerns the sensitivity of the performance measure. Perhaps the measure which was utilized for this experiment could be made more sensitive to performance change by adding more pre-post trials, by requiring the subjects to throw from closer distances, or by instating a more graded scoring system (e.g. one point for audible contact with the target, and three points for successful hits).

In conclusion, although this investigation of mental practice effects on the performance of a complex motor skill showed no statistically significant results, it highlights the need to perform further investigations in this area. The study points to the importance of close examination of the methodology and conclusions of past research, and implicates the importance of theory formation in the guiding of future research. In past research, mental practice has been shown to be a potentially valuable tool for the enhancement of sports and motor skills performance. Furthermore, although it must again be stated that

the performance results were not significant, 11 and 7% performance increases for the mental practice groups are noteworthy in this day and age when even marginal improvement of an athletic skill often means the difference between victory and defeat. It is the obligation of the researcher to define the specific parameters under which we can best utilize this tool in the pursuit of athletic and motoric excellence. In particular, an effective methodology for assessing performance effects among distinct differences in speed of mental practice has yet to be designed.

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Footnotes

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[2] Schematic diagram of this apparatus is available upon request as are copies of treatment scripts, disc instructional readings, and manipulation checks.

[3] Questionnaire items are presented in shortened form for the sake of brevity.

Table 1

Manipulation Check 1

Questions[3]	Group Means MP	SMMP	APC
1) How worthwhile is this procedure? (1)Not at all, (7)Very.	5.03	5.41	5.08
2) Will it help you become a better Frisbee player? (1)Absolutely not, (7)Most definitely.	4.67	5.01	5.15
3) How attentive were you this session? (1)Very inattentive, (7)Very attentive.	4.92	4.70	5.16
4) How much material did you understand? (1)None, (7)All.	6.32	6.72	5.81
5) Extra-session practice? (1)Yes, (0)No.	0.97	0.94	0.99
6) Dreams or daydreams about the procedures? (1)Yes, (0)No.	0.15	0.23	0.18

MP = Mental Practice
SMMP = Slow Motion Mental Practice
APC = Attention Placebo Control

Table 2

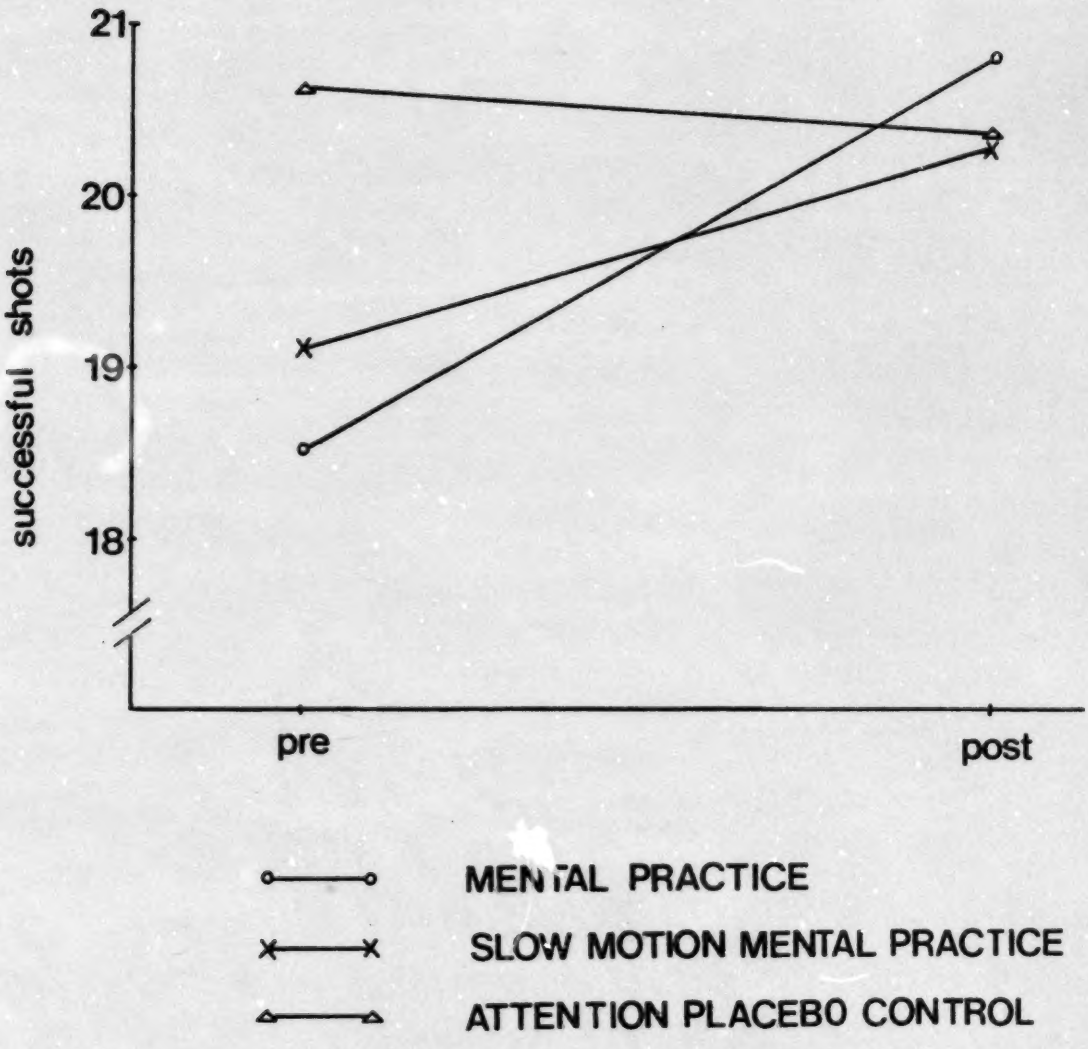
Manipulation Check 2

Questions	Group Means MP	SMMP
1) Were visual images present? (1)None, (7)Many.	5.18	5.50
2) Were these vivid images? (1)Not at all, (7)Extremely.	4.85	5.00
3) How much control did you have over them? (1)No control, (7)Total control.	4.85	4.95
4) Did you "see" from a player's, or a spectator's perspective? (1)Total spectator's, (7)Total player's.	5.46	5.17
5) Any feelings of bodily movement involved? (1)None, (7)Many.	4.58	4.80
6) Intensity of the feelings? (1)Not intense, (7)Very intense.	4.10	4.17
7) Control over the feelings? (1)No control, (7)Total control.	4.78	5.08
*9) At what "speed" did the imagery present itself? (1)Slow motion speed, (7)Accelerated speed.	3.14	3.04
10) Mental shots attempted? _____.	9.32	9.03
11) Mental shots made successfully? _____.	8.79	8.84

*Item 8 is a free-response item.

Figure Caption

Figure 1. Mean pre-post treatment group performances.


21
20
19
18
successful shots
pre
post
MENTAL PRACTICE
SLOW MOTION MENTAL PRACTICE
ATTENTION PLACEBO CONTROL